Title: A longitudinal examination of adolescent career planning and exploration using a social cognitive career theory framework

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Abstract

This study used social cognitive career theory (Lent, Brown, & Hackett, 1994), as a framework to investigate predictors of career choice actions, operationalised as career planning and career exploration. The model was tested cross-sectionally and longitudinally with 631 high school students enrolled in Grades 10, 11 and 12. Students completed measures of self-efficacy, outcome expectations, goals, supports and personality. Results of the hierarchical regression analyses indicated strong support for self-efficacy and goals predicting career planning and exploration across all grades at T1, and predicting change in career planning and exploration from T1 to T2. Whilst support for pathways among other predictor variables (personality, contextual influences and biographic variables) to choice actions was found, these pathways varied across grades at T1, and also from T1 to T2. Implications for social cognitive career theory, career counselling practice and future research are discussed.

Key Words: social cognitive career theory, career choice actions, career planning, career exploration, personality, career supports

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cognitive career theory framework

Significant career development takes place during adolescence. Adolescents begin to clarify their career identity (Erikson, 1963), develop an awareness of vocational interests and realities, and undertake career-related tasks, such as career planning and career exploration, as they increasingly think about their future career (Super, 1990). According to social cognitive career theory (SCCT; Lent, Brown, & Hackett, 1994), a variety of person, environmental and behavioural variables influence the career choice process. Self-efficacy (beliefs about capabilities to organise and execute courses of action) promotes favourable outcome expectations (expected consequences of actions), and both, individually and in concert, reinforce and foster career interests (liking) and career goals (intentions to engage in a certain activity). In turn, these social-cognitive variables stimulate career choice actions, or career behaviours, such as career planning and career exploration, which are necessary for the young person to make progress towards identified career goals.

In addition to these variables, SCCT proposes that career choice behaviours are also shaped by contextual variables, such as supports (e.g., financial support from the family) and barriers (e.g., having to leave home for further education). Contextual influences facilitate or impede the development and pursuit of an individual's career path as they have a direct influence on choice goals and choice actions, and they can also influence (i.e., moderate) the relationship between choice goals and choice actions (Lent et al., 1994). SCCT also proposes that person inputs, such as predispositions, can affect the career choice process. For example, individuals who are more likely to experience negative affect (e.g. anxiety or anger) may be more sensitive to environmental conditions, and perceive more barriers and fewer supports than those low on negative affectivity (Lent et al., 1994).

In the current study, we utilised SCCT as a framework to examine adolescent career development by investigating the influence of the three main social-cognitive variables of self-efficacy, outcome expectations and goals, together with person inputs and contextual influences on the career choice behaviours of career planning and career exploration, and to test the utility of this model for explaining career planning and career exploration over time. SCCT has been tested widely cross-sectionally, although much of this work has focused on motivation for specific occupational areas such as science, technology, engineering and mathematics (e.g., Fouad & Smith, 1996; Gainor & Lent, 1998; Lapan, Shaughnessy, & Boggs, 1996; Lent, Brown, Schmidt, et al., 2003; Lent, Lopez, & Bieschke, 1993; Lopez, Lent, Brown, & Gore, 1997; Nauta & Epperson, 2003). Few studies have tested the model longitudinally (see Lent et al., 2008 for exception), or applied it to explain the career development behaviours of planning and exploration (exceptions are Betz & Vuyten, 1997; Patton, Bartrum, & Creed, 2004; Rogers, Creed, & Glendon, 2008). Further, most studies have collected data from university samples (exceptions are Lent, Brown, Nota, & Soresi, 2003; Rogers et al., 2008) whereas the current study investigated the career action behaviours of high school students.

Career planning and exploration are actions or behaviours that are integral to the career development process. Career planning is associated with career decision self-efficacy and high levels of goal-setting (Rogers et al., 2008), work experience (Creed, Patton, & Prideaux, 2007), career expectations and goals (Patton et al., 2004), while career exploration is associated with career decision self-efficacy (Betz & Vuyten, 1997; Blustein, 1989; Brown, Darden, Shelton, & Dipoto, 1999; Creed et al., 2007). However, despite the importance placed on career planning and exploration by both Super (1957) and Crites (1973), these career preparation tasks have received little attention in the empirical and theoretical literature.

Person inputs, such as predispositions, are important components of career choice theories (e.g., Holland, 1997; Lent et al., 1994), with research showing that neuroticism, extraversion, openness and conscientiousness all influence the career choice process (see review by Tokar, Fischer, & Subich, 1998). Extraversion, for example, has been associated with planning and exploration (Savickas, Briddick, & Watkins, 2002), conscientiousness with self-efficacy, outcome expectations and goals (Judge, 2002), neuroticism, extraversion and conscientiousness with exploration (Reed, Bruch, & Haase, 2004), and conscientiousness and openness with planning (Rogers et al., 2008). However, while career theorists (Osipow, 1990; Roe, 1956; Super, 1990) emphasise that personality is an important factor in career development, research that combines personality and career choice is limited (Tokar et al., 1998), and particularly limited in the context of the SCCT framework (for exceptions see Rogers et al., 2008; Schaub & Tokar, 2005).

Career supports also have been identified as influential factors in career development (Wall, Covell, & Macintyre, 1999). For example, parents play a major role in developing children's aspirations and supporting their career exploration and planning (Astin, 1984; Eccles, 1994; Farmer, 1985; Lent et al., 2002; Young, 1994), as do teachers (Farmer, 1985; Sewell & Hauser, 1975) and friends (Furman & Buhrmeister, 1992). Rogers et al. (2008) found a direct relationship between career supports (parents, teachers, friends) and career exploration and career planning; whereas other researchers have found indirect relationships between supports and choice action behaviours, with the support influence operating mainly through self-efficacy (e.g., Lent, Brown, Schmidt, et al., 2003; Lent, Brown, Nota, et al., 2003; Lent et al., 2001). However, while career research investigating the effect of supports on choice goals and behaviour is growing, no study has tested the relationship between career supports and career action behaviours in the context of SCCT.

The current study fills a number of gaps in the literature by testing the correlates of career planning and exploration, first, using cross-sectional data, and second, by using longitudinal data, obtained from high school students from three year levels (Grades 10, 11 and 12) across multiple sites (two high schools). As the last three years of school have been shown to be a time when students are actively contemplating educational options, career paths and part-time work, examining the career attitudes of students in Grades 10, 11 and 12 over a period of six months was expected to provide evidence of developmental changes in career choice actions. The longitudinal design allowed the measurement of differences or change in a variable from one time to another to provide a description of patterns of change (Menard, 2002).

Propositions underlying SCCT (Lent et al., 1994) which are relevant to this study are that self-efficacy, outcome expectations, goals and contextual influences will be associated with the choice actions of career planning and exploration. Based on the literature, we tested an additional pathway between person inputs and choice actions; that is, that personality will be associated with choice actions. We also controlled for age, gender, work experience and school achievement as these variables have been shown to be related to career maturity (Creed et al., 2007; Luzzo, 1993; Patton & Creed, 2001). Consequently, the variables tested include career decision self-efficacy, career outcome expectations, career goals, contextual influences (career supports), person inputs (personality), biographical variables (age, gender, work experience, school achievement) and choice actions (career planning and career exploration). The main research question posed was: What are the most important variables that predict changes in choice actions over time? To answer this question, we were interested in testing two propositions:

- (1) Will the T1 predictor variables explain the outcome variables at T1, and

(2) Will changes in the predictor variables from T1 to T2, explain changes in the outcome variables from T1 to T2?

Method

Participants

We surveyed 819 students at T1. At T2, approximately six months after the first survey was administered, 631 students (74.8%) responded to a second survey. We report data on the 631 students who completed surveys at T1 and T2.

At T1, students attended two private, suburban, high schools in south-east Queensland, Australia ($N_{[1^{st} \text{ School}]} = 352, 55.8\%$; $N_{[2^{nd} \text{ School}]} = 279, 44.2\%$). Private schools in Australia receive government funding calculated using a socioeconomic status model, which is based on the ability of parents to support the school. Both schools participating in the study were rated in the middle range, meaning they attract students of middle socioeconomic level families. Two hundred and fifty-three students (40.1%) were in Grade 10, 213 (33.8%) were in Grade 11, and 165 (26.1%) were in Grade 12. There were 344 girls (54.5%) and 287 boys (45.5%), with a mean age of 15.89 years (Range = 14.07-19.92, $SD = .91$). The typical age of students in Grade 10 is 15-16 years, Grade 11 is 16-17 years and Grade 12 is 17-18 years. On a 6-point, self-report measure of school achievement (of LA+, SA, SA+, HA, HA+ and VHA, where LA = low achievement, SA = satisfactory achievement, HA = high achievement and VHA = very high achievement), 53 (8.4%) indicated they typically achieved VHA, 169 (26.8%) achieved HA+, 205 (32.5%) achieved HA, 147 (23.3%) achieved SA+, 55 (8.7%) achieved SA, and 2 (.3%) achieved LA+. Three-hundred and fifty-one students (55.6%) reported current or previous paid part-time work experience (adolescents can legally work in Australia when they turn 14 years of age).

Materials

All students completed scales tapping career planning, career exploration (outcome variables), career decision self-efficacy, outcome expectations, goals and supports at T1 and T2, and completed scales tapping personality at T1 (predictor variables).

Career Planning and Career Exploration. Career planning and exploration were measured using two subscales of the Career Development Inventory (Lokan, 1984), which was developed for use with students in Grades 8 to 12. The career planning subscale contains 20 items and measures the type and degree of career planning undertaken. A sample item is, “How much have you thought and planned about getting money to support yourself while you’re studying or training for a job?”, with a 4-point response format with endpoints of *I have not thought about this at all* to *I have made definite plans, and have started to carry them out or know what to do to carry them out*. The career exploration subscale contains 16 items and measures the range and usefulness of career exploration undertaken. A sample item is, “Which of the following sources have already given you, or directed you to, helpful information for making your future plans?”, with options of *family, teachers, friends, printed materials* etc). Higher scores indicate more planning and more exploration respectively. Adequate reliability and validity data have been reported in the manual (Lokan), and represent similar psychometric properties to those reported for the American inventory (Pinkney & Bozik, 1994). Internal reliability coefficients calculated in the present study for career planning were .91 (T1) and .92 (T2), and for career exploration were .80 (T1) and .80 (T2).

Career Decision Self-efficacy. Self-efficacy was measured using the Career Decision-Making Self-efficacy Scale – Short Form (Short Form, Betz, Klein, & Taylor, 1996a), which assesses students’ beliefs about their capacity to make career-related decisions. The scale contains 25 items, and uses a 5-point scale, with endpoints of *no confidence at all* to *complete*

confidence. A sample item is, “How confident are you that you could decide what you value most in an occupation?”. Higher scores indicate more efficacy. The scale was devised to measure the five career choice competencies that Crites (1971) proposed as relevant for the career decision process (accurate self-appraisal, gathering occupational information, goal selection, making plans for the future, and problem solving). Validity evidence has been based on expected associations with a range of other career-related constructs, such as career indecision, outcome expectations and exploratory intentions using college students (Betz, Klein, & Taylor, 1996b; Betz & Vuyten, 1997). Internal reliability coefficients typically are reported to be high (e.g., Creed, Patton, & Watson, 2002). The internal reliability coefficients for the current study were .92 (T1) and .92 (T2).

Career Outcome Expectations. Outcome expectations were assessed using a scale devised by (Betz & Vuyten, 1997), who adapted measures developed by Fouad and Smith (1996). The scale contains nine items and measures the perceived long-term consequences of success in educational and career behaviours. Five items assess beliefs about the relevance of educational performance to future career options and success, and four items assess the belief that certain behaviours would be useful to subsequent career options and decisions. Sample items include, “If I try hard enough, I will get good grades”, and “If I learn more about different careers, I will make a better career decision”. We used a 4-point response format with endpoints of *strongly disagree* to *strongly agree*. Higher scores indicate greater expectations. Betz and Vuyten (1997) reported a coefficient alpha of .97 based on a sample of college students. The internal reliability coefficients for the present sample were .83 (T1) and .79 (T2).

Career Goals. Career-related goals were assessed using a six item scale devised by Mu (1998). A sample item is, “I have a clear set of goals for my future”, with a 4-point response format with endpoints of *strongly agree* to *strongly disagree*. Higher scores

represent more career-related goal setting. Mu reported an internal reliability coefficient of .92 based on a sample of high school students and demonstrated initial validity for the scale based on expected associations with other career-related constructs. Sound psychometric properties have been reported for the scale when used with Australian high school students (Patton et al., 2004). The internal reliabilities for the present sample were .86 (T1) and .89 (T2).

Career Supports. Perceived supports were measured using the 22-item Career Influence Inventory (Fisher & Stafford, 1999), which taps supports and influences from parents, teachers, friends and the social environment. The scale was designed for use with high school students. A sample item is, “My parents/guardians make me feel that I can succeed in school”. We used a 5-point response format with endpoints of *strongly disagree* to *strongly agree*, with higher scores indicating more career support. Fisher and Stafford reported satisfactory reliability and validity data. The internal reliability coefficients with the present sample were .88 (T1) and .87 (T2).

Personality. Personality was assessed using the 60-item NEO Five-Factor Inventory (Costa & McCrae, 1989), which assesses the “big-five” personality characteristics of neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Sample items include, “I am not a worrier” (neuroticism), “I really enjoy talking to people” (extraversion), “I have a very active imagination” (openness), “I would rather co-operate with others than compete with them” (agreeableness), and “I work hard to accomplish my goals” (conscientiousness). Each item has a 5-point response format with endpoints of *strongly disagree* to *strongly agree*. Sound reliability and validity data based on college and university samples are reported in the manual (Costa & McCrae, 1992). The internal reliability coefficients for the present sample were .83 (neuroticism), .76 (extraversion), .66 (openness

to experience; we removed three items [items 2, 6, 8] that had near-zero corrected item-total correlations), .70 (agreeableness) and .84 (conscientiousness).

Procedure

The study used a two-wave longitudinal panel design with the same measures used at both times, except for the personality measure, which was administered at T1 only. The surveys were administered approximately six months apart, during the same school (and calendar) year so that the Grade 12 students could participate in a second survey before completing their final exams and leaving school. The timing also gave sufficient time for the students to reflect on and possibly amend their career attitudes and behaviours. While the participating schools did not offer a formal career education component, the students would have received career information in the interim from the school (e.g., within the normal education curricula, attending career related activities such as careers' evenings) and elsewhere (e.g., from newspapers, discussions with parents and friends). On both occasions, teachers administered the surveys in class time. There were 188 students who did not complete the survey at T2. We had little information on these students. Some were absent on the day and others were not available because of conflicting school activities. The project was conducted under the auspices of the authors' university ethics committee.

We tested two models using hierarchical regression analyses. These were: (a) do the T1 predictor variables (personality, career decision self-efficacy, career outcome expectations, career goals, career supports) predict the T1 outcome variables of career planning and career exploration, and (b) do changes in the predictor variables from T1 to T2 predict changes in the outcome variables from T1 to T2? We used difference (or raw change) scores to measure change from T1 to T2. These were calculated by subtracting T1 variable scores from T2 variable scores. Taris (2000) indicated that similar results are obtained from this approach and the regressor variable approach (in which baseline variables are not

subtracted from T2 variables but are included in their own right), but recommended the use of difference scores as this approach was more intuitive.

Results

Attrition analysis

Prior to the main analyses, we tested whether the 188 students who did not complete the T2 survey differed from those who completed surveys at both times. Chi-square and independent sample t-tests showed that the dropouts did not differ on any of the study variables, although they were older, $t(817) = 3.70, p < .001$ (M age = 16.17, $SD = .88$ vs. $M = 15.89, SD = .91$ for non-dropouts), indicating minimal attrition bias. Table 1 reports summary data for the sample at T1 and T2. Table 2 reports bivariate correlations.

Insert Tables 1 and 2 about here

T1 variables predicting Career Planning and Career Exploration at T1

We used standard multiple regression analyses to test for the effect of the T1 predictor variables on the T1 outcome variables of career planning and career exploration for each school year. We included the career (career decision self-efficacy, outcome expectations, goals and supports), personality (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness) and biographic variables (age, gender, work experience and school achievement) as predictor variables. See Table 3 for results. For career planning, the predictor variables accounted for substantial amounts of variance at each year (Grade 10 = 61%, Grade 11 = 68%, Grade 12 = 55%). Career decision self-efficacy and career goals accounted for unique variance at each year level, with students who engaged in more career planning also reporting higher goals and more confidence. At Grade 10, there was also a significant effect for agreeableness, with more agreeableness associated with more career planning. At Grade 12, work experience and extraversion were also significant, with those with work experience and more extraverted engaging in more career planning.

For career exploration, less, but still substantial, amounts of variance were explained (Grade 10 = 34%, Grade 11 = 36%, Grade 12 = 29%). Career decision self-efficacy was a consistent unique predictor across the three grades, with more confidence being associated with more career exploration. At Grade 10, age and career supports were also unique predictors, with students who were older in that year and who had more support engaging in more career exploration. At Grade 11, age, career goals and extraversion were also unique predictors, with students who were older, more extraverted and had higher goals engaging in more career exploration. At Grade 12, career supports was also a unique predictor, with students with more support engaging in more exploration.

Insert Table 3 about here

Change in Predictor Variables predicting change in Career Planning and Career Exploration

We used standard multiple regression analyses to test for the effect of changes in the predictor variables from T1 to T2 on changes in the outcome variables of career planning and career exploration from T1 to T2 for each school year. We included the T1 biographic (age, gender, work experience and school achievement) and T1 personality variables (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness), along with the T2 minus T1 (T2-T1) career change-variables (career decision self-efficacy, outcome expectations, goals and supports). The outcome measures were T2 minus T1 (T2-T1) career planning and T2 minus T1 career exploration. See Table 4 for results. The predictor variables accounted for 26% (Grade 10), 36% (Grade 11) and 39% (Grade 12) of the variance in changes in career planning from T1 to T2. Changes in career decision self-efficacy and career goals from T1 to T2 were consistent predictors across the three grades, with positive changes in self-efficacy and goals associated with positive changes in career planning. The results indicate that if career decision self-efficacy and career goals increased from T1 to T2 so to

did career planning increase from T1 to T2. At Grade 10, there was also a significant, negative effect for neuroticism, with higher neuroticism at T1 associated with a reduction in career planning from T1 to T2. At Grade 11, career supports was also significant, with increases in support from T1 to T2 associated with increases in career planning from T1 to T2.

The predictor variables accounted for 14% (Grade 10), 18% (Grade 11) and 16% (Grade 12) of the variance in changes in career exploration from T1 to T2. Change in career decision self-efficacy from T1 to T2 was a consistent predictor across the three grades. As career decision self-efficacy increased from T1 to T2 so to did career exploration increase from T1 to T2. At Grade 10, there was also a significant positive effect for career supports, with increases in career supports from T1 to T2 associated with increases in career exploration from T1 to T2. At Grade 11, career outcome expectations was also significant, with increases in expectations from T1 to T2 associated with increases in career exploration from T1 to T2. Finally, at Grade 12, extraversion was also significant, with lower levels of extraversion at T1 being associated with a reduction in career exploration from T1 to T2.

Insert Table 4 about here

Discussion

The main aim of this research was to identify the most important predictors of the adolescent career development behaviours of career planning and career exploration. Using an Australian sample of high school students, we used social cognitive career theory (SCCT) as a framework to assess these broader career constructs, and to test a direct relationship between person inputs and choice actions, using both cross-sectional and longitudinal designs. Hypotheses relevant to this study included assessing the direct relationships between self-efficacy, outcome expectations, choice goals, contextual influences and person inputs and choice actions, and assessing the relationships between changes in these variables and

changes in choice actions over time. The hypotheses were assessed in the context of controlling for a range of relevant biographic variables.

Relationships between two key social cognitive mechanisms (self-efficacy and goals) and choice actions were supported across all grade levels. First, self-efficacy and career goals were associated with career planning, and second, self-efficacy was associated with career exploration. Importantly, these results supported the SCCT model cross-sectionally (T1) and longitudinally (T1 - T2) indicating the significant and stable role that self-efficacy and goals play in affecting career choice behaviour. The concept of self-efficacy is at the centre of Bandura's (1977) social cognitive theory. Bandura explains the important link between self-efficacy and behavioural outcomes, maintaining that those who are highly efficacious are able to approach tasks as challenges to be mastered rather than as threats to be avoided. Our findings suggest that students who are confident with making career decisions and who are motivated to set goals are likely to be more career planful, and students with high levels of career decision confidence are likely to engage in more career exploration. In light of these findings, career counsellors should be encouraged to design and implement interventions that focus on strengthening career decision confidence and increasing goal-setting behaviours during the final years of school. Increasing awareness of the important role that these variables play in motivating career choice actions is recommended so that counsellors, parents and teachers can promote and support behaviours that will assist students make plans and explore possible career paths.

Support for relationships between choice actions and other variables (person inputs, contextual influences, biographic variables) in the model varied across grade level at T1 and from T1 to T2. Personality played a minor role in predicting career planning and career exploration. At T1, Grade 10 students, who were less concerned with getting on with others, and Grade 12 students, who were more outgoing and social, had higher career planning,

whereas Grade 11 students who were more outgoing and social were more likely to actively explore career options. Longitudinally, Grade 10 students who were more emotionally stable and less likely to react to stress increased their career planning from T1 to T2, while those at Grade 12 who were more introverted showed a reduction in their career exploration from T1 to T2. The findings for personality show no identifiable patterns across grade level or over time suggesting that they need to be interpreted cautiously as they may be sample dependent. Another explanation could be the instability of personality in adolescence. Some researchers have found no evidence of change over time in the mean levels of extraversion, agreeableness or conscientiousness for early adolescents (Costa, Parker, & McCrae, 2000), while others argue that personality is not set until the late twenties (Costa & McCrae, 1994). While prior findings indicate that extraversion, neuroticism, openness and conscientiousness are significant predictors of choice actions cross-sectionally (e.g., Reed et al., 2004; Rogers et al., 2008), our results do not support such relationships. We found significant bivariate correlations between all the personality measures, except agreeableness, and career planning and career exploration at T1, but these relationships largely disappeared when they were tested in the context of the other variables used in the study. These results argue for a more important role for the SCCT variables than for personality.

Partial support for the relationship between contextual influences and choice actions was evidenced by the strong relationship between career supports and exploration among Grade 10 students at T1 and also from T1 to T2. This is an important finding as previous associations between supports and career planning and career exploration have only been reported cross-sectionally, and with mixed results (Lent, Brown, Nota et al., 2003; Lent, Brown, Schmidt et al., 2003; Lent et al., 2002; Rogers et al., 2008). The findings from the present study tend to show that Grade 10 is a critical time in the career development process. It is a time when students talk to parents, teachers and friends about what subjects to study in

Grades 11 and 12, as these subject choices often act as prerequisites and affect entrance to tertiary education and other career pathways. Thus, it is important for students to feel that they can ask for and be given the time and support necessary to discuss potential career options both at school and at home.

Even though age was associated with career exploration for both Grade 10 and Grade 11 students at T1, this effect did not carry over time, nor was it a significant factor for Grade 12 students. The non-significant results for Grade 12 students at T1 is at odds with some theoretical views (e.g., Crites, 1971), that career maturity, which includes both career planning and exploration tasks, increases as students get older and progress through school. This could be due to the type of schools participating in this study; it may be that these schools implement strategies that encourage students to explore workforce and tertiary education options at all year levels; or the age range of one year within each cohort may have been too narrow to register an effect.

Work experience was found to play a role in predicting career planning for Grade 12 students at T1, albeit a minor one. This finding indicates that students who are exposed to “real world” workplace experiences and opportunities also report more career planning and thinking activities. While these results for T1 are consistent with other research (Creed et al., 2007), there was no association between work experience and career exploration at T1 for the other years, nor was there any association with changes in career planning or exploration from T1 to T2. These latter findings are inconsistent with those of Creed et al., who found a negative relationship between work experience and changes in career planning and exploration from T1 to T2. These differences in the results over time may be explained by the difference in year levels of participating students or the length of time between T1 and T2, but should be examined further, as work placements and part-time jobs are increasingly becoming part of the high school experience.

Although SCCT also hypothesises a direct relationship between outcome expectations and choice actions, this association was not supported in our models. Perhaps this can be explained by the strong direct relationship between self-efficacy and choice actions (planning and exploration), or because self-efficacy is a precursor to outcome expectations in the SCCT career choice model. Gender also did not emerge as a predictor of career planning or career exploration. Research in this area is inconsistent, with some studies finding that high school girls engage in more career exploration than boys (Patton & Creed, 2001), while others find the reverse (Fouad, 1988). SCCT emphasises the importance of examining gender differences in the career development process; thus, further research that focuses on gender differences among adolescents and their career development behaviours needs to be undertaken. We also found no association between school achievement and choice actions. Other research has found achievement level to be positively associated with career maturity (Luzzo, 1993), and career behaviours are likely to be influenced in part by efficacy beliefs as well as objective ability (Lopez et al., 1997). Future research might investigate these relationships within the SCCT framework using actual rather than self-report school achievement data, as this may have been a confound in the present study (Gramzow, Elliot, Asher, & McGregor, 2003).

This study's Australian sample included students from a largely middle socio-economic background, who were predominantly Caucasian. This limits the generalisability of the results to other high schools that include students from more diverse ethnic and socio-economic backgrounds. Consequently, the study's results need to be confirmed on more diverse populations. In addition to this, the present study used existing, general career measures rather than inventories designed to measure specific predictor-criterion relations, which can also be considered a limitation of the study. We used a time lag of six months between T1 and T2, as we considered this period to be sufficient to produce changes in this

young population. Other time lags need to be assessed as other variables may be more prominent for longer, or shorter, spans.

Career development is complex, and the decisions adolescents make rely on processing a wide range of interacting information. The present study has contributed to the literature by including biographic variables, person inputs and context within the framework of SCCT, to test how these variables influence the career choice process. Importantly, this study examined the career developmental outcome variables across time and has helped to integrate theoretical approaches to examine career-related processes by examining important person and contextual influences, such as personality and career supports, in conjunction with career attitudes. Given some inconsistency in the relationship between person inputs (personality) and contextual influences (career supports) and choice actions across grades and over time, further research examining the role these variables play in career development is recommended so that an integrative theoretical approach to career-related processes continues to be refined.

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Table 1

Summary data for all variables at T1 and T2 (N = 631).

Variables		Year 10 N = 253		Year 11 N = 213		Year 12 N = 165	
		M	SD	M	SD	M	SD
Career planning	T1	62.76	11.40	61.96	12.62	63.52	11.00
	T2	65.08	11.03	62.31	12.47	65.50	9.35
Career exploration	T1	36.59	9.08	39.06	8.54	40.16	8.03
	T2	39.16	9.30	38.46	9.72	42.27	7.28
Self-efficacy	T1	94.17	13.25	91.04	14.71	90.43	12.86
	T2	92.19	13.45	89.12	13.94	91.43	12.67
Outcome expectations	T1	29.79	3.74	29.14	3.65	29.00	3.74
	T2	29.94	3.58	28.37	4.00	27.83	3.92
Career goals	T1	18.14	3.34	17.59	3.53	17.59	3.43
	T2	18.36	3.36	17.42	3.57	18.06	3.19
Career supports	T1	80.91	10.81	78.24	11.49	80.10	11.80
	T2	79.60	10.08	78.10	10.95	80.32	12.93
Neuroticism	T1	33.98	7.48	35.07	7.66	35.98	7.05
Extraversion	T1	44.73	5.61	43.62	6.27	43.71	5.83
Openness	T1	27.83	4.93	29.15	4.84	27.88	5.10
Agreeableness	T1	41.36	5.40	41.16	5.67	40.40	5.42
Conscientiousness	T1	41.77	7.21	41.01	6.78	40.91	6.12

Table 2

Bivariate correlations among all variables at T1 and T2 (N = 631)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1. Career planning T1	-	.56	.68	.22	.70	.20	-.19	.21	.11	.00	.33	.67	.39	.54	.23	.53	.20	-.45	-.15	-.17	.02	-.19	-.00	.08	.01	.10	-.20
2. Career exploration T1		-	.44	.15	.37	.29	-.11	.24	.16	.06	.27	.41	.52	.36	.16	.29	.27	-.20	-.46	-.11	.02	-.09	-.02	-.07	.19	.19	-.10
3. Self-efficacy T1			-	.30	.64	.30	-.30	.28	.16	.12	.41	.54	.32	.62	.33	.48	.26	-.20	-.11	-.45	.05	-.17	-.04	-.00	-.14	.03	-.29
4. Outcome expectations T1				-	.32	.22	-.13	.19	.11	.13	.29	.18	.11	.22	.53	.21	.22	-.06	-.03	-.09	-.44	-.13	-.00	.00	-.10	.00	-.29
5. Career goals T1					-	.17	-.24	.15	.06	.04	.35	.52	.31	.49	.26	.57	.16	-.26	-.05	-.19	-.05	-.47	-.01	.12	-.06	.02	-.20
6. Career supports T1						-	-.18	.31	.08	.25	.35	.21	.23	.28	.26	.17	.41	-.00	-.05	-.03	.06	-.01	-.55	-.12	-.06	-.03	-.22
7. Neuroticism T1							-	-.32	.11	-.28	-.27	-.17	-.10	-.26	-.15	-.19	-.12	.04	.01	.05	-.02	.05	.05	-.20	.10	.02	.14
8. Extraversion T1								-	.06	.33	.29	.18	.20	.23	.19	.15	.23	-.05	-.03	-.06	.00	-.00	-.07	-.22	-.12	.10	-.10
9. Openness to experience T1									-	.02	-.02	.10	.08	.11	.08	-.02	.06	-.02	-.07	-.06	-.02	-.09	-.02	-.23	-.04	.05	-.15
10. Agreeableness T1										-	.37	.03	.09	.13	.09	.04	.14	.04	.03	.01	-.04	-.00	-.11	-.29	-.11	-.08	-.13
11. Conscientiousness T1											-	.34	.29	.42	.28	.32	.31	-.09	.04	.00	.01	-.04	-.04	-.07	-.06	-.02	-.35
12. Career planning T2												-	.55	.69	.32	.70	.31	.36	.16	.16	.16	.20	.09	.01	.01	.06	-.14
13. Career exploration T2													-	.45	.23	.41	.39	.16	.52	.14	.13	.11	.15	-.07	.14	.12	-.03
14. Self-efficacy T2														-	.42	.64	.36	.14	.11	.42	.22	.17	.07	-.04	-.07	.02	-.20
15. Outcome expectations T2															-	.37	.31	.10	.08	.10	.53	.12	.04	.05	-.19	-.08	-.24
16. Career goals T2																-	.22	.17	.14	.17	.18	.46	.05	.08	-.04	-.01	-.12
17. Career supports T2																	-	.11	.14	.10	.11	.06	.53	-.10	.03	-.01	-.20
18. Career planning T2-T1																		-	.38	.40	.16	.47	.11	-.08	-.03	-.06	.07
19. Career exploration T2-T1																			-	.26	.12	.20	.18	-.00	-.04	-.06	.07
20. Self-efficacy T2-T1																				-	.19	.39	.12	-.04	.09	-.01	.11
21. Outcome expectations T2-T1																					-	.25	.05	.05	-.11	-.09	.03
22. Career goals T2-T1																						-	.06	-.05	.02	-.04	.08
23. Career supports T2-T1																							-	.03	.09	.02	.03
24. Gender																								-	.01	-.03	.07
25. Age																									-	.31	.11
26. Work experience																										-	.06
27. School achievement																											-

Note: Correlations $\geq .08 = p < .05$, $\geq .11 = p < .01$, $\geq .14 = p < .001$

Table 3
Standard multiple regression analyses predicting Career Planning and Career Exploration at T1

Variables	Year 10 (N = 253)			Year 11 (N = 213)			Year 12 (N = 165)		
	B	SEB	β	B	SEB	β	B	SEB	β
<i>Career Planning</i>		$R^2 = .61$			$R^2 = .68$			$R^2 = .55$	
Age	1.59	1.25	.05	.90	1.11	.03	-.55	1.28	-.02
Gender	.91	1.08	.04	1.30	1.19	.05	.29	1.51	.01
Work experience	.12	.99	.01	.56	1.07	.02	3.04	1.52	.12*
School achievement	-.03	.47	-.00	-.00	.52	.00	-.65	.64	-.06
Self-efficacy	.35	.05	.41***	.35	.05	.41***	.20	.07	.23***
Outcome expectations	-.20	.14	-.07	-.16	.16	-.05	-.24	.18	-.08
Career goals	1.46	.19	.43***	1.72	.21	.48***	1.64	.23	.51***
Career supports	.07	.05	.07	-.08	.05	-.07	.06	.06	.06
Neuroticism	.07	.07	.07	.03	.08	.02	.07	.10	.04
Extraversion	.05	.10	.04	.11	.10	.05	.28	.12	.15*
Openness	.11	.11	.06	.05	.11	.02	-.03	.13	-.02
Agreeableness	.14	.10	-.10*	-.11	.11	-.05	.01	.14	.00
Conscientiousness	-.21	.08	.03	.10	.10	.05	.06	.12	.03
<i>Career Exploration</i>		$R^2 = .34$			$R^2 = .36$			$R^2 = .29$	
Age	2.92	1.29	.13*	3.29	1.07	.18**	1.85	1.17	.11
Gender	-1.12	1.12	-.06	-.56	1.14	-.03	.55	1.38	.03
Work experience	1.08	1.02	.06	1.66	1.02	.10	1.94	1.39	.10
School achievement	.50	.48	.06	.61	.50	.08	-.04	.58	-.01
Self-efficacy	.24	.05	.35***	.17	.05	.29**	.17	.06	.28**
Outcome expectations	-.01	.15	-.01	.06	.15	.03	-.21	.17	-.10
Career goals	.18	.19	.07	.55	.20	.23**	.37	.21	.16
Career Supports	.19	.05	.23***	.08	.05	.11	.11	.06	.17*
Neuroticism	-.08	.08	-.06	.15	.08	.13	.07	.09	.06
Extraversion	.07	.10	.04	.21	.10	.16*	.20	.11	.14
Openness	.20	.11	.11	.08	.11	.05	.06	.12	.04
Agreeableness	-.03	.11	-.02	-.08	.10	-.05	-.02	.13	-.01
Conscientiousness	.01	.09	.01	.12	.10	.10	.12	.11	.09

Note 1: For career planning, Year 10, $F(13, 239) = 28.99, p < .001$, for Year 11, $F(13, 199) = 32.84, p < .001$, and for Year 12, $F(13, 151) = 13.93, p < .001$. For career exploration, Year 10, $F(13, 239) = 9.61, p < .001$, for Year 11, $F(13, 199) = 8.72, p < .001$, and for Year 12, $F(13, 151) = 4.76, p < .001$. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4

Standard multiple regression analyses predicting changes in Career Planning and Career Exploration from T1 to T2

Variables	Year 10 (N = 253)			Year 11 (N = 213)			Year 12 (N = 165)		
	B	SEB	β	B	SEB	β	B	SEB	β
<i>Career Planning T2-T1</i>		$R^2 = .26$			$R^2 = .36$			$R^2 = .39$	
Age	-1.02	1.41	-.04	-.74	1.16	-.04	.68	1.25	.04
Gender	-2.19	1.23	-.12	-1.05	1.22	-.06	-1.75	1.49	-.09
Work experience	-.09	1.11	-.01	.61	1.11	.03	-2.63	1.51	-.12
School achievement	-.10	.52	-.01	.94	.54	.11	.62	.60	.07
Self-efficacy	.12	.05	.16*	.19	.05	.24**	.25	.06	.32**
Outcome expectations	-.02	.15	-.01	.06	.14	.02	.21	.18	.08
Career goals	1.07	.18	.37***	1.05	.19	.37***	1.24	.22	.39***
Career supports	.09	.05	.11	.10	.05	.13*	-.01	.04	-.02
Neuroticism	-.17	.08	-.14*	.10	.08	.09	-.04	.09	-.03
Extraversion	-.14	.11	-.08	-.08	.10	-.05	-.23	.12	-.14
Openness	-.10	.12	-.05	.13	.12	.07	.08	.12	.04
Agreeableness	.09	.11	.05	.02	.11	.01	.07	.13	.04
Conscientiousness	-.02	.09	-.02	.14	.10	.11	-.08	.11	-.05
<i>Career Exploration T2-T1</i>		$R^2 = .14$			$R^2 = .18$			$R^2 = .16$	
Age	-.97	1.50	-.04	-.10	1.21	-.01	-1.08	1.23	-.07
Gender	-1.60	1.31	-.09	.67	1.27	.04	.34	1.47	.02
Work experience	-.25	1.18	-.01	.01	1.15	.00	-1.68	1.49	-.09
School achievement	.45	.55	.06	.75	.56	.10	.93	.60	.12
Self-efficacy	.12	.05	.16*	.14	.06	.19*	.12	.05	.18*
Outcome expectations	-.16	.16	-.07	.31	.15	.14*	.25	.18	.11
Career goals	.29	.19	.10	.38	.20	.14	.25	.22	.10
Career supports	.18	.05	.22***	.07	.05	.09	.08	.04	.14
Neuroticism	-.02	.09	-.01	-.08	.09	-.07	.09	.09	.08
Extraversion	.12	.11	.07	-.15	.11	-.11	-.24	.12	-.18*
Openness	-.08	.12	-.04	.02	.12	.01	.04	.12	.02
Agreeableness	-.05	.12	-.03	.17	.12	.11	.07	.13	.05
Conscientiousness	.13	.09	.10	.02	.10	.02	.07	.11	.05

Note: For career planning T2-T1, Year 10, $F(13, 239) = 6.55, p < .001$, for Year 11, $F(13, 199) = 8.43, p < .001$, and for Year 12, $F(13, 151) = 7.41, p < .001$. For career exploration T2-T1, Year 10, $F(13, 239) = 2.88, p = .001$, for Year 11, $F(13, 199) = 3.24, p < .001$, and for Year 12, $F(13, 151) = 2.13, p = .015$. * = $p < .05$, ** = $p < .01$, *** = $p < .001$.